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The Athenian Mercury:

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BIBLIOTHECA BODLEIANA

Quest: 1. GEntlemen, *What think you of the Opinion of* Des Cartes *concerning the Pulse of the Arteries, that they are caused by the Pulsation of the Heart, driving the Blood through 'em in manner of a Wave?*

Answ. We think it not to be the Cause; for the Arteries are found to consist of a Quadruple Coat, the third of which is made up of Annular or Orbicular carneous Fibres to a good thickness, and is of a Muscular Nature, which after every Pulse of the Heart do contract the Vessel successively with incredible Celerity, and so by a kind of Peristaltick Motion impelling the Blood onwards to the Capillary Extremities, and thro' the Muscles with great force and swiftness. For the proof of our Assertion,

1. He instanceth the Experiment of a *Lovain* Physician, which will make it not to be a bare conjecture: He slit the Artery, and thrust into it a Pipe so big as to fill the Cavity of it, and cast a strait ligature upon that part of the Artery which contain'd the Pipe: Now when the Artery is close bound to the Pipe, notwithstanding the Blood hath free passage thro the Cavity of the pipe, yet will not the Artery beat below the ligature, but take of the ligature, 'twill beat immediately. And lest it should be Objected to this Experiment, that the Reason why when bound it did not beat, might be, because the current of the Blood being straitned by thePipe, when beneath the Pipe it came to have more Liberty, it was not sufficient to stretch the Coat of the Artery, and so cause a Pulse, but might when the ligature was taken off, flow between the enclosed Tube, and the Coat of the Artery; therefore he adds another which clearly evinces it.

2. He straitned the Artery till he made the sides almost meet, thereby lessening the passage for the Blood, the Vessel will continue still to beat below the compression.

The first of these Experiments was tryed by *Gallen*, who was of the Opinion we here Assert, the first who observ'd the third Coat of an Artery to be a Muscular Body composed of Annular Fibres, was Dr. *Willis*, much more might be said for it.

Quest. 2. *Pray what is the Reason of the Difficulty of determining the height of the Atmosphere, since at first sight it appears so very easie, a Pillar of Air equal to the heighth of the Atmosphere being equiponderant to* 30 *Inches of Quicksilver, and the proportion of Air to Quicksilver being known by Mr.* Boyle's *Experiments to be as* 1 *to* 14000 *very near?*

Answ. In Answer to which you must take Notice, that the proportion above mention'd is of the weight of our Air near the Earth, which is in a very compress'd State. Had the Experiment been made upon the top of a Mountain, three or four miles high, there would have been a far less proportion between the Air and Quicksilver. Now if a Cubical foot of Air near the Earth, and a Cubical foot near the top of the Atmosphere had been of the same weight, the heighth of the Atmosphere would be easily determined by multiplying 14000 by 30, and it gives you the heighth of it in Inches, which reduced into miles, is $6\frac{1106}{1760}$ miles: But because the Air when destitute of its pressure, has by Mr. *Boyle's* Experiments dilated it self so as to take up above 150 times its former space; therefore 'tis plain, that as the Air comes to have its pressure lessen'd, as it does the more remote it is from the Earth, therefore it expands it self proportionably, which is the Reason of the difficulty of determining its true height.

Quest. 3. *Pray Gentlemen, what is the Cause of Suction?*

Answ. We Answer, the Cause of the rising of Water by Suction, is the pressure of the Atmosphere; for let us imagine the end of a Syringe to be placed in the Water, let the Sucker be drawn up, there is then a space in the bottom of the Cavity devoid of Air: Now all the Water without the Sucker is press'd upon by the weight of the Atmosphere, except that space which is directly under the end of the Syringe, the water being thus press'd does endeavour to free it self, which it does by rising up in the Syringe, it finding there the least resistance. That it is the pressure of the Atmosphere, is evident from hence, that all the Suction in the World will not raise Water higher than 34 or 35 Feet, which is equal to the weight of a Tube of Mercury of the same Diameter of about 29 or 30 Inches, which is exactly equipondrant to a Pillar of Air equal to the height of the Atmosphere.

Quest. 4. *I have heard it often affirm'd, that a square inch of Air is able by its spring to perform the same Effects that the weight of the Atmosphere doth, which seeming a Paradox to me, I desire if you think it true, to illustrate it to me by some Experiment, you being, without doubt, conversant in things of that Nature?*

Answ. We will illustrate this two ways: 1. From the Nature of the thing it self. 2. By Experiment.

1. Granting the Air to be a springy body, which your Question doth not desire us to prove, let us consider a square inch of Air in its compress state near our Earth, that which presseth against it of all sides is the ambient Air: Now 'tis evident, that the spring of the Square inch of Air presseth as much against the ambient, as the ambient against it; if it doth not, it must press either more or less; not more, because then the square inch would be Expanded, and so take up more room, till the pressure of each was equal to each other; not less, for then the square inch must be lessen'd in its dimensions, therefore it presseth equal.

2. We propose this Experiment, tryed by Mr. *Boyle*. He took a Glass Bottle able to contain about a quart of water, and fill'd it about half full of Mercury, then putting into the Neck of this Bottle a Tube of above 30 Inches long, open at both ends, the lower Orifice being immers'd in the stagnant Mercury, he then fill'd up the space between the mouth of the Bottle, and the Glass Tube with good cement, so that the Air included in the Bottle could no way get out of the Bottle; and having placed this Bottle and Tube in a Receiver, as the Air in the Receiver was more and more exhausted, (and by consequence the pressure of the Air taken from that part of the Mercury that was enclosed in the Tube) the Mercury did proportionably rise, till the Receiver being well Exhausted, the Mercury attain'd the height of 29 Inches $\frac{3}{8}$ which was but $\frac{1}{8}$ short of the height of the Mercury in another Tube, the Cistern of which was prest upon by the Atmosphere. That this was done by the Spring of the Air, is evident, for the weight of so much Air as was imprison'd in the Bottle, would not amount to above a Grain. If you ask, What is the Reason that the spring of the Air did not raise the Mercury in the Tube placed in the Receiver so high as that in the open Air by one 8th.? We Answer, The Reason is, because as the Mercury is forc'd out of the Bottle into the Tube, the Air within the Bottle acquires more Liberty, and so is expanded, and by consequence somewhat weaker in its spring. The Reason why we instance in a quantity of Air so much bigger than a square inch, you may understand from the foregoing words, for the Quicksilver rising would cause that little quantity of Air to be expanded

too

too much for to raiſe the Mercury to the height above mention'd.

Queſt. 5. *It has been obſerved by many Seamen, particularly by my ſelf the laſt time I went to the* West-Indies, *that if a Bottle having nothing elſe in it but Air be ſtopt up with a very ſtrong, cloſe, big Cork, yet upon letting it down ſo many Fathoms deep, when I drew up the Bottle I found the Cork within the Bottle, I deſire to know the Reaſon of it?*

Anſw. We have already ſpoken upon this Head, but having had ſome New Propoſals about Water being let down, ſtopt with a Cork in a Bottle, We ſhall conſider it once more, and under one Anſwer both Phenomena's. Firſt as to Air, It is to be remarkt that the Air where We breath is in a certain compreſs'd State, and much cloſer and condenſe than what it is towards the top of the Atmoſphere, or even upon high Mountains as the *Pic of Teneriff*, *Mount Caucaulus*, &c. becauſe the Weight of the ſuperimpending Atmoſphere lyes hard upon the lower parts, as ſuch as have read Mr. *Boyl's* Experiments upon the *Weight and Spring of the Air* are ſufficiently ſatisfied in. But to return from this digreſſion, Suppoſe the Air that is in the Bottle befo e it is corkt up, bears only ſo much Weight as a Colum of the Air to the top of the Atmoſphere impreſſes upon it, and when the Cork is put in, ſuppoſe alſo that the Air in the Bottle preſſes juſt ſo hard againſt the Cork as the Air without; now if this Bottle be let down into the Water, which is a much cloſer Element than Air (a ſmall Tube of Water being in Proportion to the Weight of the Air as 1000 (near) to 1) it follows that ſince there is a Compreſſure in Water (its Nature conſider'd) as in the Air, the Water that is on the outſide the Cork, as it is let deeper and deeper will ſtill preſs harder and harder upon the Cork, and the Air within the Bottle being only capable of repreſſing or reſiſting according to the force which it had when above Water is at length over-power'd by the External Preſſure of the Water, and ſo the Cork is forced in. But as for the other Conſideration, (ſuggeſted by a Gentleman of our Acquaintance) *viz. Whether a Bottle fill'd with Water, that is Quantity for Quantity lighter than other Water,* (as ſome ſuch there is) *and this Water be ſtopt in with a Cork and let down into the Sea any depth whatever, whether the External Water which muſt preſs upon the Cork more or leſs, according to the Depth and Gravitation of the ſupernatural Waters, will force the Cork into the Water in the Bottle, which being but in a ſmall compreſs'd State, will be able to make little reſiſtance?* To this We alſo Anſwer, That many Experiments ſhow that Water cannot be poſſibly put into a leſſer room than it is by any Force or Violence, nor dilated by any Methods (We mean whilſt it remains Water) altho' Air (as Mr. *Boyle* tells you he has done it) may be expanded and dilated in above 150 times its room, and in this compreſs'd State that it is in at the bottom of the Atmoſpere it may be yet contracted into a much leſſer room, our Experiments have given us Inſtances of its Contraction into 20 times a leſſer ſpace, ſo that there is little relation (in this Caſe at leaſt) betwixt Water and Air, and therefore We may very poſitively aſſert, that Water in the Condition We find it, Corkt up, and let down even to the Center of the Earth, would make as much reſiſtance againſt the Cork internally as the circumambient Water would externally, and by conſequence the Cork would not be drove or impell'd in the Bottle, as in the Caſe of Air.

Queſt. 6. *What is the Reaſon that when you lay a Leaf of a Tree over any hollow place, ſuppoſe the fore-part of your Hand half graſpt, and with the other Hand ſtrike upon the Leaf, it ſhall break with a Noiſe like a Pot-gun?*

Anſw. When the Leaf is laid upon the place, it is equally compreſs'd on every ſide, and the Air above it preſſes juſt as hard upon it as the Air under it does againſt it, but when with the hollow of your other Hand you violently ſtrike againſt the Leaf, the Air that is contain'd in the hollow of your Hand preſſes harder againſt the upper part of the Leaf than the Air under it does againſt it, and therefore this giving way that breaks thro' the Leaf: As for the Noiſe, it is only the brisk agitation of the Air put into a violent Motion, which ſtriking ſmartly againſt the Drum of the Air, gives what We call the Perception of Sound or Hearing. And here by the by We ſhall prevent ſome who might poſſibly be troubled to deſire an Anſwer to this Queſtion, *Were a Bottle has all the Air exhauſted out of it, if you clap your Hand upon it, will it ſuck your Hand ſo hard as to break it?* to this alſo We Anſwer, that indeed it has been an Opinion which has rul'd for ſome thouſand Years, that Suction was only caus'd by that Occult Quality call'd *Fuga Vacui*, or Natures abhorrence of a Vacuum; but now 'tis demonſtrably evident, that 'tis only the Preſſure of the Atmoſphere, as in the mention'd Inſtance, when the Air is drawn out of the Bottle, and there is nothing within left to reſiſt the Hand that is clapt upon the Mouth of the Bottle, therefore the Preſſure is wholly from without: Whether it will preſs the Hand ſo hard as to break a Hole thro' it, We know not, having had no great Mind to make the Experiment, tho' 'tis evident that the ſtrongeſt Bladder will not reſiſt the External Preſſure of the Air, and 'tis this Act that is falſly call'd Suction, there being no ſuch thing in Nature.

The Mathematical Mercury *ſo long promis'd, will be Publiſht next* Saturday, *as alſo ſomething very Curious relating to the* Load-ſtone.

Advertiſements.

☞ A Diſcourſe of Chriſtian Religion in ſundry Points, *Viz.* Chriſt the Hope of Glory. The Knowledge of God in Chriſt. Chriſt the Only Saviour; The Great Redeemer; The Only Mediator; The Foundation of our Adoption: And the Neceſſity of Preaching Chriſt. Preached at the Merchants Lecture in *Broad-ſtreet*, by *Thomas Cole*, Miniſter of the Goſpel in *London*. *London*, Printed for *Tho. Cockerill* at the *three Leggs* in the *Poultrey*, over againſt the *Stocks-Market*. 1693.

☞ A Gentleman having ſent a Queſtion to the *Athenian Society* how he may Change his Hair that is *Red* to a *Brown Colour*, their Bookſeller has ſince receiv'd Information of a Gentlewoman who has attain'd to great Perfection in that as well as in many other *Secrets for the preſerving and improving of Beauty*: She pretends with a clear Water which ſhe prepares to Colour the Hair of a very good Brown or Black (which ſhall be deſir'd) ſo that it ſhall neither ſmoot any thing, nor come off with Sweat, or even with Waſhing, as may appear by Locks of her Colouring, which are to be ſeen, half Brown, and half of the Natural Red. She has ſent this Advertiſement for the farther ſatisfaction of the Gentleman before mention'd, and others, and is to be ſpoken with over againſt the *King's Bagnio* in *Long Acre* next Door to Mr. *Amee's* a Surgeon, on *Tueſdayes*, *Thurſdays* and *Frydayes*, at any time of the Day.

☞ A Conference betwixt a Modern Atheiſt and his Friend. *By the Methodizer of* The Second Spira. This Book is Printed on the ſame ſize with the *Second Spira*, that they might bind up together. Price 6 *d*. Printed for *John Dunton* at the *Raven* in the *Poultrey*.

☞ IN *Grays-Inn-lane* in *Plow-yard*, the third Door, lives Dr. *Thomas Kirlews*, a Collegiate Phyſician, and Sworn Phyſician in Ordinary to King *Charles* the Second, until his death; who with a Drink and Pill (hindring no Buſineſs) undertakes to Cure any Ulcers, Sores, Swellings in the Nole, Face, or other parts; Scabs, Itch, Scurfs, Leproſies, and Venerial Diſeaſe, expecting nothing until the Cure be finiſhed: Of the laſt he hath cured many hundreds in this City, many of them after fluxing, which carries the evil from the Lower Parts to the Head, and ſo deſtroys many. The Drink is 3 *s*. the Quart, the Pill 1 *s*. a Box, with Directions; a better Purger than which was never given, for they cleanſe the Body of all Impurities, which are the cauſes of Dropſies, Gouts, Scurvies, Stone or Gravel, Pains in the Head, and other parts. With another Drink at 11 *s*. 6 *d*. a Quart. He cures all Fevers and hot Diſtempers without Bleeding, except in few Bodies. He gives his Opinion to all that writes or comes for nothing.

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